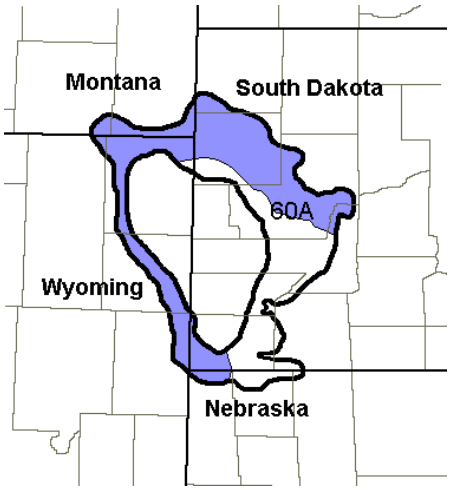
United States Department of Agriculture
Natural Resources Conservation Service

Ecological Site Description



Site Type: Rangeland

Site Name: Clayey 13-16" P.Z.

Site ID: R060AY011SD

Major Land Resource Area: 60A – Pierre Shale Plains

Physiographic Features

This site occurs on nearly level to steep uplands.

Landform: fan, plain, hill, terrace **Aspect:** N/A

	Minimum	Maximum
Elevation (feet):	2500	4300
Slope (percent):	0	30
Water Table Depth (inches):	None	None
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	Low	Very High

Climatic Features

The climate in this MLRA is typical of the drier portions of the Northern Great Plains where sagebrush steppes to the west yield to grassland steppes to the east. Annual precipitation ranges from 13 to 16 inches per year, with most occurring during the growing season. Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold winter air masses from Canada move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring. The normal average annual temperature is about 46° F. January is the coldest month with average temperatures ranging from about 19° F (Moorcroft CAA, WY) to about 22° F (Belle Fourche, SD). July is the warmest month with temperatures averaging from about 70° F (Moorcroft CAA, WY) to about 72° F (Belle Fourche, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 51° F. Hourly winds are estimated to average about 11 miles per hour annually, ranging from about 13 miles per hour during the spring to about 10 miles per hour during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 miles per hour.

Growth of cool season plants begins in early to mid March, slowing or ceasing in late June. Warm season plants begin growth about mid May and continue to early or mid September. Green up of cool season plants may occur in September and October when adequate soil moisture is present.

	Minimum	Maximum
Frost-free period (days):	122	129
Freeze-free period (days):	145	152
Mean Annual Precipitation (inches):	13	16

Average Monthly Precipitation (inches) and Temperature (ºF):

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.32	0.41	7.1	34.1
February	0.44	0.51	12.6	40.1
March	0.65	0.91	19.7	46.5
April	1.43	1.72	29.4	60.2
May	2.45	2.83	39.7	70.6
June	2.34	2.81	48.5	80.1
July	1.60	2.32	54.8	88.0
August	1.24	1.45	53.1	87.7
September	1.01	1.27	42.3	77.0
October	0.90	1.11	31.4	64.9
November	0.40	0.54	19.8	47.5
December	0.40	0.43	10.2	38.0

Climate Stations		Period	
Station ID	**Location or Name**	**From**	**To**
SD0236	Ardmore 2 N	1948	1999
SD0559	Belle Fourche	1948	1999
WY6395	Moorcroft CAA	1948	1998
WY9207	Upton 13 SW	1949	1998

For other climate stations that may be more representative, refer to http://www.wcc.nrcs.usda.gov.

Influencing Water Features

No significant water features influence this site.

Representative Soil Features

The soils in this site are well drained and formed in alluvium, colluvium, and residuum derived primarily from shale. The silty clay to silt loam surface layer is 2 to 7 inches thick. The soils have a moderately slow to slow infiltration rate. When dry these soils crack. When wet surface compaction can occur with heavy traffic. This site typically should show slight to no evidence of rills, wind scoured areas or pedestalled plants. Water flow paths are broken, irregular in appearance or discontinuous with numerous debris dams or vegetative barriers. The soil surface is stable and intact. Sub-surface soil layers are non-restrictive to water movement and root penetration.

These soils are mainly susceptible to water erosion. The hazard of water erosion increases on slopes greater than about 5 percent. More information can be found in the various soil survey reports. Contact the local USDA Service Center for soil survey reports that include more detail specific to your location.

Parent Material Kind: residuum, colluvium, alluvium
Parent Material Origin: shale, clayey
Surface Texture: silt loam, silty clay loam, silty clay
Surface Texture Modifier: none
Subsurface Texture Group: clayey
Surface Fragments ≤ 3" (% Cover): 0
Surface Fragments > 3" (%Cover): 0
Subsurface Fragments ≤ 3" (% Volume): 0-13
Subsurface Fragments > 3" (% Volume): 0-6

	Minimum	Maximum
Drainage Class:	well	well
Permeability Class:	very slow	moderately slow
Depth (inches):	20	80
Electrical Conductivity (mmhos/cm)*:	0	8
Sodium Absorption Ratio*:	0	13
Soil Reaction (1:1 Water)*:	6.1	9.0
Soil Reaction (0.1M CaCl2)*:	NA	NA
Available Water Capacity (inches)*:	3	7
Calcium Carbonate Equivalent (percent)*:	0	15

* - These attributes represent from 0-40 inches or to the first restrictive layer.

Plant Communities

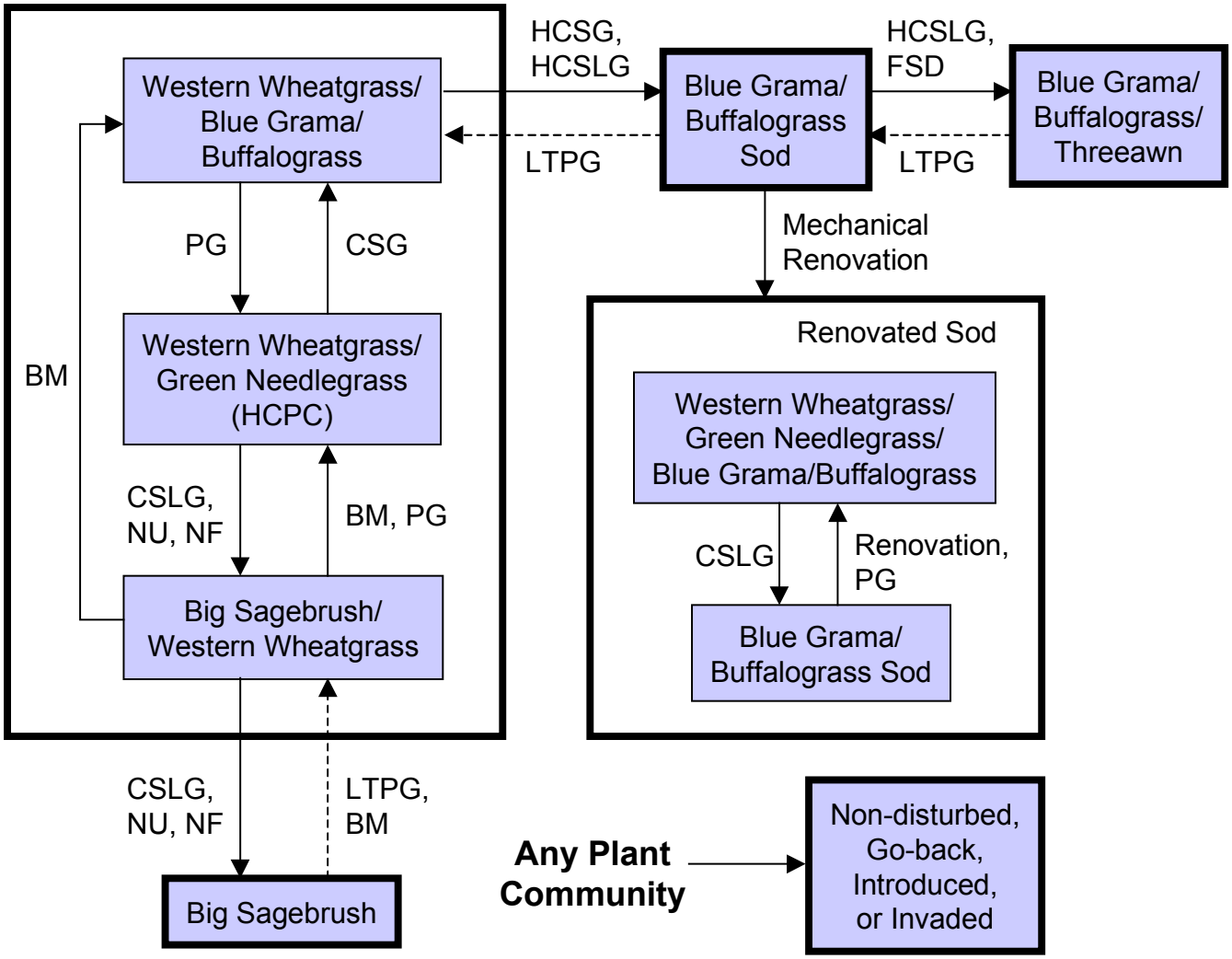
Ecological Dynamics of the Site:
This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts of native and/or exotic plant and animal species, and management actions. While the following plant community descriptions describe more typical transitions between communities that will occur, severe disturbances, such as periods of well-below average precipitation, can cause significant shifts in plant communities and/or species composition.

Black greasewood, ponderosa pine, Rocky Mountain juniper, eastern redcedar and bur oak occur in small amounts on several sites in the MLRA. These same species may encroach into associated sites, changing site characteristics. These shifts can alter site dynamics and potential.

The plant community upon which interpretations are primarily based is the Historic Climax Plant Community (HCPC). The HCPC has been determined by studying rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

The following diagram illustrates the common plant communities and vegetation states commonly occurring on the site and the transition pathways between communities and states. The ecological processes are discussed in more detail in the plant community descriptions following the diagram.

Plant Communities and Transitional Pathways



BM - Brush Management; **CSG** - Continuous seasonal grazing; **CSLG** - Continuous season-long grazing; **FSD** - Frequent, severe defoliation; **HCPC** - Historic Climax Plant Community; **HCSG** - Heavy, continuous seasonal grazing; **HCSLG** - Heavy, continuous season-long grazing; **LTPG** - Long-term prescribed grazing; **NF** - No fire; **NU** - Non-use; **PG** - Prescribed grazing.

Plant Community Composition and Group Annual Production

			Western Wheatgrass/ Green Needlegrass (HCPC)		
COMMON/GROUP NAME	**SCIENTIFIC NAME**	**SYMBOL**	**Group**	**lbs./acre**	**% Comp**
GRASSES & GRASS-LIKES				*1440 - 1620*	*80 - 90*
RHIZOMATOUS WHEATGRASSES			**1**	**630 - 900**	**35 - 50**
western wheatgrass	Pascopyrum smithii	PASM	1	630 - 900	35 - 50
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	1	630 - 900	35 - 50
COOL-SEASON MID GRASSES			**2**	**450 - 720**	**25 - 40**
green needlegrass	Nassella viridula	NAVI4	2	450 - 720	25 - 40
WARM-SEASON SHORT GRASSES			**3**	**90 - 270**	**5 - 15**
blue grama	Bouteloua gracilis	BOGR2	3	36 - 180	2 - 10
buffalograss	Buchloe dactyloides	BUDA	3	0 - 90	0 - 5
WARM-SEASON MID GRASSES			**4**	**90 - 270**	**5 - 15**
sideoats grama	Bouteloua curtipendula	BOCU	4	90 - 270	5 - 15
OTHER NATIVE GRASSES & GRASS-LIKES			**5**	**90 - 180**	**5 - 10**
big bluestem	Andropogon gerardii	ANGE	5	0 - 90	0 - 5
needleandthread	Hesperostipa comata ssp. comata	HECOC8	5	0 - 90	0 - 5
prairie junegrass	Koeleria macrantha	KOMA	5	0 - 90	0 - 5
plains reedgrass	Calamagrostis montanensis	CAMO	5	0 - 90	0 - 5
Sandberg bluegrass	Poa secunda	POSE	5	0 - 90	0 - 5
sedge	Carex spp.	CAREX	5	0 - 90	0 - 5
other perennial grasses		2GP	5	0 - 90	0 - 5
FORBS			*7*	*90 - 180*	*5 - 10*
American vetch	Vicia americana	VIAM	7	0 - 18	0 - 1
aster	Aster spp.	ASTER	7	0 - 18	0 - 1
biscuitroot	Lomatium spp.	LOMAT	7	0 - 18	0 - 1
bluebells	Mertensia spp.	MERTE	7	0 - 18	0 - 1
cudweed sagewort	Artemisia ludoviciana	ARLU	7	0 - 36	0 - 2
cutleaf ironplant	Machaeranthera pinnatifida	MAPI	7	0 - 18	0 - 1
deathcamas	Zigadenus spp.	ZIGAD	7	0 - 18	0 - 1
deervetch	Lotus unifoliolatus var. unifoliolatus	LOUNU	7	0 - 18	0 - 1
dotted gayfeather	Liatris punctata	LIPU	7	0 - 18	0 - 1
false boneset	Brickellia eupatorioides	BREU	7	0 - 18	0 - 1
milkvetch	Astragalus spp.	ASTRA	7	0 - 18	0 - 1
Missouri goldenrod	Solidago missouriensis	SOMI2	7	0 - 36	0 - 2
penstemon	Penstemon spp.	PENST	7	0 - 18	0 - 1
prairie coneflower	Ratibida columnifera	RACO3	7	0 - 36	0 - 2
purple coneflower	Echinacea angustifolia	ECAN2	7	0 - 18	0 - 1
pussytoes	Antennaria spp.	ANTEN	7	0 - 18	0 - 1
scarlet gaura	Gaura coccinea	GACO5	7	0 - 18	0 - 1
scarlet globemallow	Sphaeralcea coccinea	SPCO	7	0 - 36	0 - 2
scurfpea	Psoralidium spp.	PSORA2	7	0 - 36	0 - 2
spiny phlox	Phlox hoodii	PHHO	7	0 - 18	0 - 1
wavyleaf thistle	Cirsium undulatum	CIUN	7	0 - 18	0 - 1
western ragweed	Ambrosia psilostachya	AMPS	7	0 - 18	0 - 1
western wallflower	Erysimum capitatum var. capitatum	ERCAC	7	0 - 18	0 - 1
western yarrow	Achillea millefolium	ACMI2	7	0 - 18	0 - 1
wild onion	Allium spp.	ALLIU	7	0 - 18	0 - 1
wild parsley	Musineon divaricatum	MUDI	7	0 - 18	0 - 1
woolly Indianwheat	Plantago patagonica	PLPA2	7	0 - 18	0 - 1
other perennial forbs		2FP	7	0 - 36	0 - 2
SHRUBS			*8*	*90 - 180*	*5 - 10*
big sagebrush	Artemisia tridentata	ARTR2	8	0 - 180	0 - 10
cactus	Opuntia spp.	OPUNT	8	0 - 18	0 - 1
fourwing saltbush	Atriplex canescens	ATCA2	8	0 - 36	0 - 2
fringed sagewort	Artemisia frigida	ARFR4	8	0 - 18	0 - 1
rose	Rosa spp.	ROSA5	8	0 - 36	0 - 2
rubber rabbitbrush	Ericameria nauseosa	ERNA10	8	0 - 36	0 - 2
winterfat	Krascheninnikovia lanata	KRLA2	8	0 - 90	0 - 5
CRYPTOGAMS			*9*	*0 - 18*	*0 - 1*
clubmoss	Selaginella densa	SEDE2	9	0 - 18	0 - 1

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES & GRASS-LIKES	730 -	1521	- 2110
FORBS	85 -	135	- 185
SHRUBS	85 -	135	- 185
CRYPTOGAMS	0 -	9	- 20
TOTAL	900 -	1800	- 2500

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative value.

Plant Community Composition and Group Annual Production

		Western Wheatgrass/ Green Needlegrass (HCPC)			Western Wheatgrass/Blue Grama/Buffalograss			Blue Grama/Buffalograss Sod		
COMMON/GROUP NAME	SYMBOL	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES			*1440 - 1620*	*80 - 90*		*1120 - 1360*	*70 - 85*		*488 - 585*	*75 - 90*
RHIZOMATOUS WHEATGRASSES		**1**	**630 - 900**	**35 - 50**	**1**	**400 - 560**	**25 - 35**	**1**	**33 - 98**	**5 - 15**
western wheatgrass	PASM	1	630 - 900	35 - 50	1	400 - 560	25 - 35	1	33 - 98	5 - 15
thickspike wheatgrass	ELLAL	1	630 - 900	35 - 50	1	400 - 560	25 - 35	1	33 - 98	5 - 15
COOL-SEASON MID GRASSES		**2**	**450 - 720**	**25 - 40**	**2**	**80 - 160**	**5 - 10**	**2**	**0 - 13**	**0 - 2**
green needlegrass	NAVI4	2	450 - 720	25 - 40	2	80 - 160	5 - 10	2	0 - 13	0 - 2
WARM-SEASON SHORT GRASSES		**3**	**90 - 270**	**5 - 15**	**3**	**480 - 800**	**30 - 50**	**3**	**260 - 390**	**40 - 60**
blue grama	BOGR2	3	36 - 180	2 - 10	3	320 - 480	20 - 30	3	228 - 325	35 - 50
buffalograss	BUDA	3	0 - 90	0 - 5	3	160 - 320	10 - 20	3	98 - 195	15 - 30
WARM-SEASON MID GRASSES		**4**	**90 - 270**	**5 - 15**	**4**	**0 - 160**	**0 - 10**	**4**	**0 - 13**	**0 - 2**
sideoats grama	BOCU	4	90 - 270	5 - 15	4	0 - 160	0 - 10	4	0 - 13	0 - 2
NATIVE GRASSES/GRASS-LIKES		**5**	**90 - 180**	**5 - 10**	**5**	**160 - 320**	**10 - 20**	**5**	**98 - 195**	**15 - 30**
big bluestem	ANGE	5	0 - 90	0 - 5	5	0 - 32	0 - 2			
needleandthread	HECOC8	5	0 - 90	0 - 5	5	0 - 160	0 - 10	5	0 - 65	0 - 10
prairie junegrass	KOMA	5	0 - 90	0 - 5	5	32 - 160	2 - 10	5	33 - 65	5 - 10
plains reedgrass	CAMO	5	0 - 90	0 - 5	5	0 - 80	0 - 5	5	0 - 33	0 - 5
Sandberg bluegrass	POSE	5	0 - 90	0 - 5	5	32 - 112	2 - 7	5	13 - 46	2 - 7
sedge	CAREX	5	0 - 90	0 - 5	5	80 - 240	5 - 15	5	65 - 130	10 - 20
dropseed	SPORO				5	0 - 48	0 - 3	5	0 - 20	0 - 3
threeawn	ARIST				5	0 - 80	0 - 5	5	0 - 65	0 - 10
other perennial grasses	2GP	5	0 - 90	0 - 5	5	0 - 80	0 - 5	5	0 - 33	0 - 5
NON-NATIVE GRASSES		**6**			**6**	**0 - 112**	**0 - 7**	**6**	**0 - 98**	**0 - 15**
cheatgrass	BRTE				6	0 - 80	0 - 5	6	0 - 65	0 - 10
Kentucky bluegrass	POPR				6	0 - 80	0 - 5	6	0 - 33	0 - 5
FORBS		*7*	*90 - 180*	*5 - 10*	*7*	*160 - 240*	*10 - 15*	*7*	*33 - 65*	*5 - 10*
American vetch	VIAM	7	0 - 18	0 - 1	7	0 - 32	0 - 2	7	0 - 13	0 - 2
aster	ASTER	7	0 - 18	0 - 1	7	0 - 32	0 - 2	7	0 - 13	0 - 2
biscuitroot	LOMAT	7	0 - 18	0 - 1	7	0 - 32	0 - 2	7	0 - 13	0 - 2
bluebells	MERTE	7	0 - 18	0 - 1	7	0 - 16	0 - 1	7	0 - 7	0 - 1
cudweed sagewort	ARLU	7	0 - 36	0 - 2	7	0 - 48	0 - 3	7	0 - 20	0 - 3
curlycup gumweed	GRSQ				7	0 - 48	0 - 3	7	0 - 20	0 - 3
cutleaf ironplant	MAPI	7	0 - 18	0 - 1	7	0 - 32	0 - 2	7	0 - 13	0 - 2
deathcamas	ZIGAD	7	0 - 18	0 - 1	7	0 - 16	0 - 1	7	0 - 7	0 - 1
deervetch	LOUNU	7	0 - 18	0 - 1	7	0 - 48	0 - 3	7	0 - 20	0 - 3
dotted gayfeather	LIPU	7	0 - 18	0 - 1	7	0 - 32	0 - 2	7	0 - 13	0 - 2
false boneset	BREU	7	0 - 18	0 - 1	7	0 - 16	0 - 1			
fetid marigold	DYPA							7	0 - 13	0 - 2
goldenpea	THRH				7	0 - 32	0 - 2	7	0 - 13	0 - 2
milkvetch	ASTRA	7	0 - 18	0 - 1	7	0 - 32	0 - 2	7	0 - 13	0 - 2
Missouri goldenrod	SOMI2	7	0 - 36	0 - 2	7	0 - 32	0 - 2	7	0 - 13	0 - 2
mustard	BRASS2				7	0 - 32	0 - 2	7	0 - 13	0 - 2
penstemon	PENST	7	0 - 18	0 - 1	7	0 - 16	0 - 1	7	0 - 7	0 - 1
prairie coneflower	RACO3	7	0 - 36	0 - 2	7	0 - 32	0 - 2	7	0 - 13	0 - 2
purple coneflower	ECAN2	7	0 - 18	0 - 1	7	0 - 16	0 - 1	7	0 - 7	0 - 1
pussytoes	ANTEN	7	0 - 18	0 - 1	7	0 - 16	0 - 1	7	0 - 7	0 - 1
scarlet gaura	GACO5	7	0 - 18	0 - 1	7	0 - 16	0 - 1			
scarlet globemallow	SPCO	7	0 - 36	0 - 2	7	0 - 48	0 - 3	7	0 - 20	0 - 3
scurfpea	PSORA2	7	0 - 36	0 - 2	7	0 - 32	0 - 2	7	0 - 13	0 - 2
spiny phlox	PHHO	7	0 - 18	0 - 1	7	0 - 16	0 - 1	7	0 - 7	0 - 1
sweetclover	MELIL				7	0 - 80	0 - 5	7	0 - 33	0 - 5
wavyleaf thistle	CIUN	7	0 - 18	0 - 1	7	0 - 16	0 - 1	7	0 - 7	0 - 1
western ragweed	AMPS	7	0 - 18	0 - 1	7	0 - 32	0 - 2	7	0 - 13	0 - 2
western wallflower	ERCAC	7	0 - 18	0 - 1	7	0 - 16	0 - 1	7	0 - 7	0 - 1
western yarrow	ACMI2	7	0 - 18	0 - 1	7	0 - 48	0 - 3	7	0 - 20	0 - 3
wild onion	ALLIU	7	0 - 18	0 - 1	7	0 - 16	0 - 1	7	0 - 7	0 - 1
wild parsley	MUDI	7	0 - 18	0 - 1	7	0 - 32	0 - 2	7	0 - 13	0 - 2
woolly Indianwheat	PLPA2	7	0 - 18	0 - 1	7	0 - 32	0 - 2	7	0 - 13	0 - 2
other annual forbs	2FA				7	0 - 16	0 - 1	7	0 - 20	0 - 3
other perennial forbs	2FP	7	0 - 36	0 - 2	7	0 - 48	0 - 3	7	0 - 20	0 - 3
SHRUBS		*8*	*90 - 180*	*5 - 10*	*8*	*80 - 240*	*5 - 15*	*8*	*33 - 98*	*5 - 15*
big sagebrush	ARTR2	8	0 - 180	0 - 10	8	0 - 160	0 - 10	8	0 - 33	0 - 5
broom snakeweed	GUSA2				8	0 - 80	0 - 5	8	0 - 33	0 - 5
cactus	OPUNT	8	0 - 18	0 - 1	8	0 - 48	0 - 3	8	0 - 46	0 - 7
fourwing saltbush	ATCA2	8	0 - 36	0 - 2	8	0 - 32	0 - 2			
fringed sagewort	ARFR4	8	0 - 18	0 - 1	8	0 - 48	0 - 3	8	13 - 65	2 - 10
rose	ROSA5	8	0 - 36	0 - 2	8	0 - 48	0 - 3	8	0 - 20	0 - 3
rubber rabbitbrush	ERNA10	8	0 - 36	0 - 2	8	0 - 32	0 - 2	8	0 - 7	0 - 1
winterfat	KRLA2	8	0 - 90	0 - 5	8	0 - 16	0 - 1			
CRYPTOGAMS		*9*	*0 - 18*	*0 - 1*	*9*	*0 - 48*	*0 - 3*	*9*	*0 - 13*	*0 - 2*
clubmoss	SEDE2	9	0 - 18	0 - 1	9	0 - 48	0 - 3	9	0 - 13	0 - 2

Annual Production lbs./acre	LOW RV HIGH	LOW RV HIGH	LOW RV HIGH
GRASSES & GRASS-LIKES	730 - 1521 - 2110	470 - 1216 - 1550	340 - 530 - 715
FORBS	85 - 135 - 185	155 - 200 - 250	30 - 49 - 70
SHRUBS	85 - 135 - 185	75 - 160 - 250	30 - 65 - 100
CRYPTOGAMS	0 - 9 - 20	0 - 24 - 50	0 - 7 - 15
TOTAL	900 - 1800 - 2500	700 - 1600 - 2100	400 - 650 - 900

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative value.

Plant Community Composition and Group Annual Production

		Western Wheatgrass/ Green Needlegrass (HCPC)			Big Sagebrush/ Western Wheatgrass			Blue Grama/Buffalograss/ Threeawn		
COMMON/GROUP NAME	SYMBOL	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES			*1440 - 1620*	*80 - 90*		*1040 - 1280*	*65 - 80*		*350 - 630*	*50 - 90*
RHIZOMATOUS WHEATGRASSES		**1**	**630 - 900**	**35 - 50**	**1**	**480 - 640**	**30 - 40**	**1**	**35 - 105**	**5 - 15**
western wheatgrass	PASM	1	630 - 900	35 - 50	1	400 - 640	25 - 40	1	35 - 105	5 - 15
thickspike wheatgrass	ELLAL	1	630 - 900	35 - 50	1	80 - 240	5 - 15	1	0 - 35	0 - 5
COOL-SEASON MID GRASSES		**2**	**450 - 720**	**25 - 40**	**2**	**320 - 480**	**20 - 30**	**2**	**0 - 21**	**0 - 3**
green needlegrass	NAVI4	2	450 - 720	25 - 40	2	320 - 480	20 - 30	2	0 - 21	0 - 3
WARM-SEASON SHORT GRASSES		**3**	**90 - 270**	**5 - 15**	**3**	**240 - 400**	**15 - 25**	**3**	**70 - 210**	**10 - 30**
blue grama	BOGR2	3	36 - 180	2 - 10	3	160 - 240	10 - 15	3	35 - 140	5 - 20
buffalograss	BUDA	3	0 - 90	0 - 5	3	160 - 240	10 - 15	3	35 - 140	5 - 20
WARM-SEASON MID GRASSES		**4**	**90 - 270**	**5 - 15**	**4**	**80 - 160**	**5 - 10**	**4**		
sideoats grama	BOCU	4	90 - 270	5 - 15	4	80 - 160	5 - 10			
NATIVE GRASSES/GRASS-LIKES		**5**	**90 - 180**	**5 - 10**	**5**	**80 - 160**	**5 - 10**	**5**	**35 - 245**	**5 - 35**
big bluestem	ANGE	5	0 - 90	0 - 5						
needleandthread	HECOC8	5	0 - 90	0 - 5	5	0 - 80	0 - 5	5	0 - 35	0 - 5
prairie junegrass	KOMA	5	0 - 90	0 - 5	5	0 - 80	0 - 5	5	0 - 21	0 - 3
plains reedgrass	CAMO	5	0 - 90	0 - 5	5	0 - 80	0 - 5			
Sandberg bluegrass	POSE	5	0 - 90	0 - 5	5	0 - 80	0 - 5	5	0 - 14	0 - 2
sedge	CAREX	5	0 - 90	0 - 5	5	32 - 112	2 - 7	5	14 - 70	2 - 10
dropseed	SPORO				5	0 - 48	0 - 3	5	0 - 21	0 - 3
threeawn	ARIST				5	0 - 80	0 - 5	5	35 - 140	5 - 20
other perennial grasses	2GP	5	0 - 90	0 - 5	5	0 - 80	0 - 5	5	0 - 35	0 - 5
NON-NATIVE GRASSES		**6**			**6**	**0 - 80**	**0 - 5**	**6**	**35 - 105**	**5 - 15**
cheatgrass	BRTE				6	0 - 80	0 - 5	6	35 - 105	5 - 15
Kentucky bluegrass	POPR				6	0 - 80	0 - 5	6	0 - 14	0 - 2
FORBS		*7*	*90 - 180*	*5 - 10*	*7*	*80 - 160*	*5 - 10*	*7*	*70 - 210*	*10 - 30*
American vetch	VIAM	7	0 - 18	0 - 1	7	0 - 32	0 - 2			
aster	ASTER	7	0 - 18	0 - 1	7	0 - 32	0 - 2	7	0 - 14	0 - 2
biscuitroot	LOMAT	7	0 - 18	0 - 1	7	0 - 32	0 - 2			
bluebells	MERTE	7	0 - 18	0 - 1	7	0 - 16	0 - 1			
cudweed sagewort	ARLU	7	0 - 36	0 - 2	7	0 - 32	0 - 2	7	14 - 35	2 - 5
curlycup gumweed	GRSQ				7	0 - 32	0 - 2	7	0 - 35	0 - 5
cutleaf ironplant	MAPI	7	0 - 18	0 - 1	7	0 - 16	0 - 1	7	0 - 7	0 - 1
deathcamas	ZIGAD	7	0 - 18	0 - 1	7	0 - 16	0 - 1			
deervetch	LOUNU	7	0 - 18	0 - 1	7	0 - 48	0 - 3			
dotted gayfeather	LIPU	7	0 - 18	0 - 1	7	0 - 16	0 - 1	7	0 - 7	0 - 1
false boneset	BREU	7	0 - 18	0 - 1						
fetid marigold	DYPA							7	14 - 70	2 - 10
goldenpea	THRH				7	0 - 32	0 - 2			
milkvetch	ASTRA	7	0 - 18	0 - 1	7	0 - 16	0 - 1			
Missouri goldenrod	SOMI2	7	0 - 36	0 - 2	7	0 - 32	0 - 2	7	0 - 14	0 - 2
mustard	BRASS2				7	0 - 32	0 - 2	7	0 - 56	0 - 8
penstemon	PENST	7	0 - 18	0 - 1	7	0 - 16	0 - 1			
prairie coneflower	RACO3	7	0 - 36	0 - 2	7	0 - 32	0 - 2	7	0 - 7	0 - 1
purple coneflower	ECAN2	7	0 - 18	0 - 1	7	0 - 16	0 - 1			
pussytoes	ANTEN	7	0 - 18	0 - 1	7	0 - 16	0 - 1	7	0 - 35	0 - 5
scarlet gaura	GACO5	7	0 - 18	0 - 1						
scarlet globemallow	SPCO	7	0 - 36	0 - 2	7	0 - 48	0 - 3	7	0 - 7	0 - 1
scurfpea	PSORA2	7	0 - 36	0 - 2	7	0 - 32	0 - 2			
spiny phlox	PHHO	7	0 - 18	0 - 1	7	0 - 16	0 - 1	7	0 - 7	0 - 1
sweetclover	MELIL				7	0 - 80	0 - 5	7	0 - 70	0 - 10
wavyleaf thistle	CIUN	7	0 - 18	0 - 1	7	0 - 16	0 - 1			
western ragweed	AMPS	7	0 - 18	0 - 1	7	0 - 16	0 - 1	7	7 - 35	1 - 5
western wallflower	ERCAC	7	0 - 18	0 - 1	7	0 - 16	0 - 1			
western yarrow	ACMI2	7	0 - 18	0 - 1	7	0 - 48	0 - 3	7	0 - 14	0 - 2
wild onion	ALLIU	7	0 - 18	0 - 1	7	0 - 16	0 - 1			
wild parsley	MUDI	7	0 - 18	0 - 1	7	0 - 48	0 - 3			
woolly Indianwheat	PLPA2	7	0 - 18	0 - 1	7	0 - 16	0 - 1	7	0 - 21	0 - 3
other annual forbs	2FA				7	0 - 16	0 - 1	7	0 - 70	0 - 10
other perennial forbs	2FP	7	0 - 36	0 - 2	7	0 - 32	0 - 2	7	0 - 35	0 - 5
SHRUBS		*8*	*90 - 180*	*5 - 10*	*8*	*240 - 400*	*15 - 25*	*8*	*35 - 140*	*5 - 20*
big sagebrush	ARTR2	8	0 - 180	0 - 10	8	80 - 320	5 - 20	8	0 - 7	0 - 1
broom snakeweed	GUSA2				8	0 - 32	0 - 2	8	7 - 70	1 - 10
cactus	OPUNT	8	0 - 18	0 - 1	8	0 - 80	0 - 5	8	7 - 105	1 - 15
fourwing saltbush	ATCA2	8	0 - 36	0 - 2	8	0 - 32	0 - 2			
fringed sagewort	ARFR4	8	0 - 18	0 - 1	8	0 - 48	0 - 3	8	14 - 105	2 - 15
rose	ROSA5	8	0 - 36	0 - 2	8	0 - 48	0 - 3			
rubber rabbitbrush	ERNA10	8	0 - 36	0 - 2	8	0 - 32	0 - 2	8	0 - 21	0 - 3
winterfat	KRLA2	8	0 - 90	0 - 5	8	0 - 80	0 - 5			
CRYPTOGAMS		*9*	*0 - 18*	*0 - 1*	*9*	*0 - 48*	*0 - 3*	*9*	*0 - 14*	*0 - 2*
clubmoss	SEDE2	9	0 - 18	0 - 1	9	0 - 48	0 - 3	9	0 - 14	0 - 2

Annual Production lbs./acre	LOW RV HIGH	LOW RV HIGH	LOW RV HIGH
GRASSES & GRASS-LIKES	730 - 1521 - 2110	605 - 1136 - 1460	305 - 466 - 625
FORBS	85 - 135 - 185	75 - 120 - 165	65 - 140 - 215
SHRUBS	85 - 135 - 185	220 - 320 - 425	30 - 88 - 145
CRYPTOGAMS	0 - 9 - 20	0 - 24 - 50	0 - 7 - 15
TOTAL	900 - 1800 - 2500	900 - 1600 - 2100	400 - 700 - 1000

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative value.

Plant Community and Vegetation State Narratives

Following are the narratives for each of the described plant communities. These plant communities may not represent every possibility, but they are the most prevalent and repeatable plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more information is collected, some of these plant community descriptions may be revised or removed, and new ones added. None of these plant communities should necessarily be thought of as "Desired Plant Communities". According to the USDA NRCS National Range and Pasture Handbook, Desired Plant Communities (DPC's) will be determined by the decision makers and will meet minimum quality criteria established by the NRCS. The main purpose for including any description of a plant community here is to capture the current knowledge and experience at the time of this revision.

Western Wheatgrass/Green Needlegrass Plant Community

The plant community upon which interpretations are primarily based is the Western Wheatgrass/Green Needlegrass Plant Community. This is also considered the Historic Climax Plant Community (HCPC). This plant community can be found on areas that are properly managed with grazing and/or prescribed burning, and on areas receiving occasional short periods of deferment.

The potential vegetation is about 80-90% grasses or grass-like plants, 5-10% forbs, and 5-10% shrubs. Cool season grasses dominate this plant community. The major grasses are western wheatgrass and green needlegrass. Other graminoids include blue grama, buffalograss, sideoats grama, prairie junegrass and sedge. Significant forbs include scarlet globemallow, wild parsley, biscuitroot, golden pea, sego lily, deervetch, American vetch, and milkvetch. Significant shrubs that occur include big sagebrush, cactus, winterfat, rose and fourwing saltbush.

This plant community is well adapted to the Northern Great Plains climatic conditions. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). The diversity in plant species allows for high drought tolerance. This is a healthy and sustainable plant community. Moderate or high available water capacity provides a favorable soil-water-plant relationship. Overall the interpretive plant community has the appearance of being extremely stable, diverse and productive. Plant litter is properly distributed with very little movement off-site and natural plant mortality is low. Most plant species have a wide range of age classes represented and reproduction is not limited. Plant roots occupy most of the soil profile, which provides for soil stability and promotes infiltration.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during an average year:
Growth curve number: SD6001
Growth curve name: Pierre Shale Plains, cool-season dominant.
Growth curve description: Cool-season dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	4	12	25	36	10	5	4	4	0	0

Transitions or community pathways leading to other plant communities are as follows:

- Continuous seasonal grazing during the active growing period of cool season plants will lead to the *Western Wheatgrass/Blue Grama/Buffalograss Plant Community*.
- Continuous season-long grazing will lead to the *Big Sagebrush/Western Wheatgrass Plant Community*. This occurs when the HCPC is exposed to herbivory during the entire plant growing season at moderate stocking rates. Non-use and no fire will also shift this plant community to the *Big Sagebrush/Western Wheatgrass Plant Community* as the vigor of the perennial herbaceous vegetation is reduced through lack of grazing.

Western Wheatgrass/Blue Grama/Buffalograss Plant Community

This plant community develops under continuous seasonal grazing (i.e., grazing an area during the same season every year) or from over utilization during extended drought periods. The potential vegetation is made up of approximately 70-85% grasses and grass-like species, 10-15% forbs and 5-10% shrubs. The dominant grasses include blue grama, buffalograss, and western and/or thickspike wheatgrass. Other grasses may include green needlegrass, prairie junegrass, and Sandberg bluegrass. Significant forbs include scarlet globemallow, wild parsley, biscuitroot, phlox, golden pea, deer vetch, asters, and milkvetch. The significant shrubs that occur include big sagebrush, cactus, broom snakeweed and rose.

Compared to the Historic Climax Plant Community, the shortgrass species, especially blue grama and buffalograss have increased. The cool season species including western wheatgrass and green needlegrass have decreased in composition. Annual bromes, curlycup gumweed, sweetclover and other annual grasses and forbs can invade the site. While plant diversity is relatively high, short grasses dominate the structure of the community.

This plant community is resistant to change. The dominant herbaceous species are very adapted to grazing; however, the mid-grass species and the more palatable forbs will decrease in the community through continuous seasonal grazing. If the herbaceous component is intact, it tends to be resilient if disturbance is not long-term. Because of the sod forming habit of the dominant shortgrass species, water infiltration is low, and runoff is moderate to high. Typically runoff is very clean because of low potential for on-site soil erosion. However, off-site areas may be affected by increased runoff.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during an average year:
Growth curve number: SD6003
Growth curve name: Pierre Shale Plains, cool-season/warm-season co-dominant.
Growth curve description: Cool-season, warm-season co-dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	20	28	21	10	5	3	0	0

Transitions or community pathways leading to other plant communities are as follows:

- Prescribed grazing, which allows for adequate plant recovery periods, will move this plant community to the *Western Wheatgrass/Green Needlegrass Plant Community*. Periods of non-use or deferment may be a management option to reach the HCPC.
- Heavy continuous seasonal grazing will move this plant community towards the *Blue Grama/Buffalograss Sod Plant Community*. This would be typical of calving/lambing pastures where the unit is continuously utilized during the late winter through mid spring. This transition will result in decreased forage production and plant species diversity. In addition, with heavy continuous season-long grazing, this plant community will move to the *Blue Grama/Buffalograss Sod Plant Community*. During this transition, the plant community can have the appearance of a mosaic, with sod and mixed grass communities intermingled.

Blue Grama/Buffalograss Sod Plant Community

This plant community develops under heavy continuous season-long grazing, and with continuous seasonal grazing with concentrated use in the early part of the growing season (as in calving/lambing pastures). It is made up of approximately 75-90% grasses (primarily short, warm season grasses), 5-10% forbs, and 5-15% shrubs. The dominant grasses include blue grama and buffalograss. Other grasses may include western wheatgrass, prairie junegrass, threeawn, and annual brome. The dominant forbs include slimflower scurfpea, pussytoes, curlycup gumweed and scarlet globemallow. The dominant shrub is plains pricklypear.

Compared to the Historic Climax Plant Community, short grasses have increased, and cool season mid grasses have diminished greatly. Some forbs and cactus have either increased and/or invaded the site. Plant diversity is low.

This plant community is very stable. Generally, this plant community will require significant management inputs (i.e., high animal impact, long term prescribed grazing, favorable climatic conditions, etc.) and time to move it towards the Western Wheatgrass/Blue Grama/Buffalograss Plant Community. On-site soil erosion is low. Infiltration is low, and runoff is high. Typically runoff is low in suspended particles because of the low potential for on-site soil erosion. However, off-site areas can be significantly impacted due to the increased runoff.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during an average year:
Growth curve number: SD6005
Growth curve name: Pierre Shale Plains, warm-season dominant.
Growth curve description: Warm-season dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	2	5	15	25	30	15	7	1	0	0

Transitions or community pathways leading to other plant communities are as follows:

- Long-term prescribed grazing and favorable precipitation which allows for adequate plant recovery periods, will move this plant community towards the *Western Wheatgrass/Blue Grama/Buffalograss Plant Community*. Periods of non-use or deferment may be a management option to facilitate this movement.
- Mechanical renovation (specifically contour furrowing) will move this plant community to the renovated *Western Wheatgrass/Green Needlegrass/Blue Grama/Buffalograss Plant Community*. Proper grazing management must be included in order to derive the benefits of renovation.

Big Sagebrush/Western Wheatgrass Plant Community

This plant community develops from continuous season long grazing and the absence of fire. It will also develop with extended periods of non-use and lack of fire. Sagebrush will typically increase whenever the vigor of the perennial herbaceous vegetation is reduced and fire is absent. This plant community is made up of 65-80% mid cool season and short warm season grasses, 5-10% forbs, and 15-25% shrubs. The dominant grasses include western wheatgrass, green needlegrass, blue grama and buffalograss. As conditions deteriorate, desirable species are replaced by big sagebrush. Blue grama, buffalograss, prairie junegrass and Sandberg bluegrass increase in the plant community. Annual brome, other annuals, and Kentucky bluegrass can invade the plant community.

Under proper management, this plant community is stable. The soil erosion is low to moderate. Infiltration and runoff are moderate. Subsoil moisture conditions are typically drier than grass dominated plant communities due to the high water demand of the big sagebrush. This makes big sagebrush highly competitive with other species.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during an average year:
Growth curve number: SD6003
Growth curve name: Pierre Shale Plains, cool-season/warm-season co-dominant.
Growth curve description: Cool-season, warm-season co-dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	20	28	21	10	5	3	0	0

Transitions or community pathways leading to other plant communities are as follows:

- With brush management and prescribed grazing, this plant community will move towards the *Western Wheatgrass/Green Needlegrass Plant Community (HCPC)*.
- With brush management alone, this plant community will move towards the *Western Wheatgrass/Blue Grama/Buffalograss Plant Community*.
- Continuous season-long grazing and no fire, or non-use and no fire will shift this plant community to the *Big Sagebrush Plant Community*.

Big Sagebrush Plant Community

This plant community is the result of protection from grazing and fire, or the result of long-term continuous season long grazing. Sagebrush dominates this plant community with canopy cover often exceeding 40%. The canopy cover will be higher in the western portions of the MLRA. The understory of grass includes rhizomatous wheatgrasses, green needlegrass, sideoats grama, Sandberg bluegrass, and prairie junegrass. The sagebrush canopy protects the cool season grasses, but this protection makes them unavailable for grazing. Big sagebrush is long-lived and will persist for a long period.

This plant community differs from the Historic Climax Plant Community by an increase in big sagebrush and a decrease in grasses such as green needlegrass and big bluestem. This plant community can provide valuable winter feed for both livestock (especially sheep) and wildlife (such as mule deer and antelope). The soil is protected from erosion. The watershed is functioning and the biotic community is intact.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during an average year:
Growth curve number: SD6004
Growth curve name: Pierre Shale Plains, warm-season dominant, cool-season sub-dominant.
Growth curve description: Warm-season dominant, cool-season sub-dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	7	18	25	25	15	7	1	0	0

Transitions or community pathways leading to other plant communities are as follows:

- With brush management and long-term prescribed grazing, this plant community may eventually return to the *Big Sagebrush/Western Wheatgrass Plant Community*.

Renovated Sod Vegetation State

An altered vegetation community can be achieved through mechanical renovation. Renovation creates microrelief that alters the water cycle by increasing infiltration and decreasing runoff. The renovation reduces the sod-bound conditions, increasing the vegetative production potential. These factors favor cool season species such as western wheatgrass, green needlegrass, and a variety of forbs.

The renovated **Western Wheatgrass/Green Needlegrass/Blue Grama/Buffalograss Plant Community** will have similar plant composition and growth curve characteristics as the Western Wheatgrass/Blue Grama/Buffalograss Plant Community. However, the production will likely be higher, depending on the degree of alteration. Proper grazing management must be implemented to maintain this plant community. Continuous season-long grazing will move this plant community to the renovated Blue Grama/Buffalograss Sod Plant Community.

The renovated **Blue Grama/Buffalograss Plant Community** is similar to the non-renovated Blue Grama/Buffalograss Plant Community in most respects. The main difference is the microrelief created by the renovation.

Non-Disturbed, Go-back, Introduced, or Invaded

This group includes four separate vegetation states that are highly variable in nature. They are derived through four distinct management scenarios, and are not related successionally. Infiltration, runoff and soil erosion vary depending on the vegetation present on the site.

The **Non-Disturbed** state develops from extended periods of exclusion by large herbivores, fire suppression and lack of other surface disturbance. Plant litter accumulates in large amounts when this community first develops. Litter buildup reduces mature plant vigor and density, and seedling recruitment declines. Eventually litter levels become high enough that plant density decreases. Interspaces are commonly filled by annual forbs, annual grasses, and cryptogams. Typically rhizomatous grasses form small colonies because of a lack of tiller stimulation.

The **Go-back** state can be reached whenever severe mechanical disturbance (i.e., abandoned farmland) occurs. During the early successional stages, the species that mainly dominate are annual grasses and forbs, later being replaced by both native and introduced perennials. The vegetation on this site varies greatly, sometimes being dominated by three-awn, annual brome, crested wheatgrass, buffalograss, broom snakeweed, sweetclover and non-native thistles. Other plants that commonly occur on the site include western wheatgrass, deathcamas, prickly lettuce, marestail, kochia, squirreltail, foxtail and annual sunflower. If remnant populations are sufficient, western wheatgrass can sometimes rapidly occupy this state.

The **Introduced** state is normally related to areas seeded to crested wheatgrass, pubescent or intermediate wheatgrass and alfalfa. They require considerable investment to establish and have a variable life expectancy. They do produce up to 50% more than native range, but their value as forage is somewhat limited due to the single species usually seeded.

The **Invaded** state includes areas that have been invaded by species such as smooth brome, Kentucky bluegrass, crested wheatgrass, non-native thistles, field bindweed, knapweeds, leafy spurge, hoary cress and other introduced species. These species can become dominant typically on areas receiving heavy disturbance prior to invasion.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

-- Under Development --

Western Wheatgrass/Green Needlegrass Plant Community:

Western Wheatgrass/Blue Grama/Buffalograss Plant Community:

Big Sagebrush/Western Wheatgrass Plant Community:

Big Sagebrush Plant Community:

Blue Grama/Buffalograss Sod Plant Community:

Western Wheatgrass/Green Needlegrass/Blue Grama/Buffalograss Plant Community:

Blue Grama/Buffalograss Sod (Renovated) Plant Community: See the description under the Blue Grama/Buffalograss Sod Plant Community.

Non-disturbed, Go-back, Introduced or Invaded Vegetation States:

Animal Preferences (Quarterly – 1,2,3,4†)

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses & Grass-likes							
big bluestem	U D P D	U U D U	U D P D	U D U U	U D U U	U D P D	U D P D
blue grama	U D P D	D P P D	U D P U	D P P D	D P P D	U D P U	U D P U
buffalograss	U U P D	U U P D	U U D U	N U D U	N U D U	U U D U	U U D U
green needlegrass	U P U D	N P N P	U P U D	N P N P	N P N P	U P U D	U P U D
needleandthread	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
plains reedgrass	U D U U	N D N N	U D U U	N D N N	N D N N	U D U U	U D U U
prairie junegrass	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
Sandberg bluegrass	U U U U	U D U U	N U N N	N D N N	N D N N	N U N N	N U N N
sedge	U P U D	U P U D	U D U D	U D U D	U D U D	U D U D	U D U D
sideoats grama	U D P D	U P D D	U D P U	U P D U	U P D U	U D P U	U D P U
thickspike wheatgrass	U D D U	U D U U	U D D U	N D N N	N D N N	U D D U	U D D U
western wheatgrass	U P D D	U D U U	U P D U	N D N N	N D N N	U P D U	U P D U
Forbs							
American vetch	U D P U	U P P U	U D P U	U P P U	U P P U	U D P U	U P P U
aster	U U D U	U U D U	U U D U	U U D U	U U D U	U U D U	U U D U
biscuitroot	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
bluebells	U D U U	U P P U	U D U U	U P P U	U P P U	U D U U	U P P U
cudweed sagewort	U U U U	U U D U	U U U U	U U D U	U U D U	U U U U	U U D U
cutleaf ironplant	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
deathcamas	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
deervetch	U U U U	U D D U	U U U U	U D D U	U D D U	U U U U	U D D U
dotted gayfeather	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
false boneset	U U D U	N D U N	U U D U	N D U N	N D U N	U U D U	N D U N
milkvetch	U U U U	U D U U	U U U U	U D U U	U D U U	U U U U	U D U U
Missouri goldenrod	U U D U	N U U N	U U D U	N U U N	N U U N	U U D U	N U U N
penstemon	U U U U	U P P U	U U U U	U P P U	U P P U	U U U U	U P P U
prairie coneflower	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
purple coneflower	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
pussytoes	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
scarlet gaura	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
scarlet globemallow	U U D U	U D D U	U U D U	U D D U	U D D U	U U D U	U D D U
scurfpea	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
spiny phlox	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
wavyleaf thistle	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
western ragweed	U U U U	U U U U	U U U U	N N N N	N N N N	U U U U	N N N N
western wallflower	U D U U	N U U N	U D U U	N U U N	N U U N	U D U U	N U U N
western yarrow	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
wild onion	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
wild parsley	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
woolly Indianwheat	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
Shrubs							
big sagebrush	U U U U	D U U D	U N U U	P U D P	P P P P	U N U U	D U U U
cactus	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
fourwing saltbush	P D D P	P D D P	P D D P	P D D P	P D D P	P D D P	P D D P
fringed sagewort	U U U U	U U U U	U U U U	U D D U	U P P D	U U U U	U U U D
rose	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U
rubber rabbitbrush	N N N N	D U U D	N N N N	D U U D	U P P U	N N N N	D U U U
winterfat	P P P P	P P P P	P P P P	P P P P	P P P P	P P P P	P P P P
Cryptogams							
clubmoss	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N

N = not used; **U** = undesirable; **D** = desirable; **P** = preferred; **T** = toxic
† Quarters: 1 – Jan., Feb., Mar.; 2 – Apr., May, Jun.; 3 – Jul., Aug., Sep.; 4 – Oct., Nov., Dec.

Animal Community – Grazing Interpretations

The following table lists annual, suggested initial stocking rates with average growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of conservation planning. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this a resource inventory is necessary to document plant composition and production. More accurate carrying capacity estimates should eventually be calculated using the following stocking rate information along with animal preference data and actual stocking records, particularly when grazers other than cattle are involved. With consultation of the land manager, more intensive grazing management may result in improved harvest efficiencies and increased carrying capacity.

Plant Community	Average Annual Production (lbs./acre, air-dry)	Stocking Rate* (AUM/acre)
Western Wheatgrass/Green Needlegrass	1800	0.55 – 0.60
Western Wheatgrass/Blue Grama/Buffalograss	1600	0.50 – 0.55
Blue Grama/Buffalograss Sod	650	0.20 – 0.25
Big Sagebrush/Western Wheatgrass	1600	0.45 – 0.50
Big Sagebrush	---	---
Renovated Western Wheatgrass/Green Needlegrass/ Blue Grama/Buffalograss	2500	0.80**
Renovated Blue Grama/Buffalograss	900	0.30**

* Based on 790 lbs./acre (air-dry weight) per Animal Unit Month (AUM), and on 25% harvest efficiency (refer to USDA NRCS, National Range and Pasture Handbook).

** Highly variable; stocking rate needs to be determined on site.

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage. During the dormant period, the forage for livestock will likely be lacking protein to meet livestock requirements, and added protein will allow ruminants to better utilize the energy stored in grazed plant materials. A forage quality test (either directly or through fecal sampling) should be used to determine the level of supplementation needed.

Hydrology Functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic groups C and D. Infiltration varies from very low to moderate, and runoff potential varies from moderate to very high depending on soil hydrologic group, slope and ground cover. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be high runoff when short grasses form a strong sod and dominate the site. Normally areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

Recreational Uses

This site provides hunting opportunities for upland game species. The wide variety of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

Wood Products

Other Products

Seed harvest of native plant species can provide additional income on this site.

Supporting Information

Associated Sites

(060AY021SD) – Clayey Overflow (060AY018SD) – Dense Clay (060AY012SD) – Thin Upland
(060AY017SD) – Shallow Clayey (060AY010SD) – Loamy 13-16" P.Z.

Similar Sites

(060AY021SD) – Clayey Overflow [more big bluestem; higher production]
(060AY018SD) – Dense Clay [less green needlegrass & short grasses; more western wheatgrass]
(060AY010SD) – Loamy 13-16" P.Z. [less green needlegrass; more needleandthread]

Inventory Data References

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel was also used. Those involved in developing this site description include: Everet Bainter, Range Management Specialist, NRCS; Stan Boltz, Range Management Specialist, NRCS; Brandon Brazee, Range Management Specialist, NRCS; Darrel DuVall, Range Management Specialist, NRCS; Jill Epley, Range Management Specialist, NRCS; Glen Mitchell, Range Management Specialist, NRCS; Cheryl Nielsen, Range Management Specialist, NRCS; Rick Peterson, Range Management Specialist, NRCS; Maxine Rasmussen, Range Management Specialist, NRCS; Mike Stirling, Range Management Specialist, NRCS.

Data Source	Number of Records	Sample Period	State	County
SCS-RANGE-417	9	1968 – 1989	NE & SD	Fall River, Sioux

State Correlation

This site has been correlated between Montana, Nebraska, South Dakota & Wyoming in MLRA 60A.

Field Offices

Belle Fourche, SD	Chadron, NE	Gillette, WY	Newcastle, WY	Sundance, WY
Broadus, MT	Ekalaka, MT	Hot Springs, SD	Rapid City, SD	Wall, SD
Buffalo, SD	Faith, SD	Lusk, WY	Sturgis, SD	

Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 43e – Sagebrush Steppe, 43g – Semiarid Pierre Shale Plains, and 43k – Dense Clay Prairie.

Other References

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (http://hpccsun.unl.edu)
USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224. (http://wcc.nrcs.usda.gov)
USDA, NRCS. National Range and Pasture Handbook, September 1997
USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526. (http://nasis.nrcs.usda.gov)
USDA, NRCS, 2002. National Soil Survey Handbook, title 430-VI. (http://soils.usda.gov/procedures/handbook/main.htm)
USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.
USDA, NRCS, Various Published Soil Surveys.

Site Description Approval

MT, State Range Management Specialist	Date	NE, State Range Management Specialist	Date
SD, State Range Management Specialist	Date	WY, State Range Management Specialist	Date